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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,043	03/08/2005	Raj G. Rajendran	CL2000USPCT	6819

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E I du Pont de Nemours and Company
Legal - Patents
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Wilmington, DE 19898

EXAMINER

ENIN-OKUT, EDU E

ART UNIT	PAPER NUMBER
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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,043	Applicant(s) RAJENDRAN, RAJ G.	
	Examiner Edu E. Enin-Okut	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/21/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Applicant's claim for the benefit of a prior-filed application, U.S. Provisional Patent Application No. 60/410,766 (filed on September 13, 2002), under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged.

Claim Objections

2. Claims 10 and 11 are objected to because of the following informalities:

- Claims 10 and 11 recite "175 μ " and "250 μ ", respectively. It appears that this should be --175 μ m-- and --250 μ m--, respectively.
- Claim 14 recites "CF₂CF₂SO₃H". It appears that this should be --CF₂CF₂SO₃H--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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5. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being obvious over Banerjee et al, U.S. Patent No. 5,672,438 (cited in IDS).

Regarding claim 1, Banerjee teaches a direct methanol fuel cell (Title; Abstract) comprising:

(a) a solid fluorinated polymer electrolyte membrane [26], wherein the solid polymer electrolyte membrane has a first surface and a second surface (2:62-3:5; Fig. 3; claim 15-16); and

(b) at least one catalyst layer present on each of the first and second surfaces of the solid polymer electrolyte membrane [22, 30] (6:64-7:3);

As to solid fluorinated polymer electrolyte membrane [26] having an ion exchange ratio (IXR) of at least about 17, Banerjee teaches that cation exchange membrane 26 has an IXR of at least about 23 (2:62-3:5; claim 1).

Since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art (e.g., *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)), it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a solid fluorinated polymer electrolyte membrane having an IXR of at least about 17 into the direct oxide fuel cell of Banjeree as recited in this claim. See MPEP 2144.05 (I).

As to wherein the fuel cell is operated at a temperature of less than 60 °C; and, wherein the methanol cross-over rate is reduced by at least about 20%; and, the power output is equal to or increased up to about 15%, versus a fuel cell comprising a solid fluorinated polymer electrolyte membrane having the same thickness, and an ion exchange ratio (IXR) of about 15, these limitations have been considered, and construed as the manner of operating an apparatus that adds no additional structure to the fuel cell apparatus as claimed. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2

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USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. However, because the solid polymer electrolyte membrane of the direct methanol fuel cell of Banerjee is structurally similar to that instantly disclosed, the fuel cell appears capable of being operated as claimed with similar if not identical claimed characteristics.

Regarding claims 2 and 3, Banerjee teaches that the IXR is 23 to 29 (2:65-3:5; 4:62-66; claims 1-2).

Banerjee does not expressly teach that the IXR is from 17 to 29, or from 19 to 23, as recited in claims 2 and 3, respectively.

However, since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art (e.g., *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)), it would have been obvious to one of ordinary skill in the art to use a solid polymer electrolyte membrane in the direct oxide fuel cell of Banerjee with an IXR in ranges as recited by claims 2-3. See MPEP 2144.05 (I).

Regarding claim 4, Banerjee teaches that the IXR is 23 (2:65-3:5; claim 1).

Regarding claims 5-9, the limitations recited in these claims have been considered, and construed as the manner of operating an apparatus that adds no additional structure to the fuel cell system as claimed. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. However, because the direct methanol fuel cell of Banerjee is structurally similar to that instantly disclosed, the fuel cell appears capable of being operated as claimed with similar if not identical claimed characteristics.

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Regarding claim 10, Banerjee teaches the thickness of the membrane, having an IXR of 23 (2:62-3:5), can be varied as desired for a particular electrochemical cell application (5:54-55). Typically, the thickness of the membrane is generally less than about 250 μm (5:55-57).

However, Banerjee does not expressly teach the thickness of the membrane is 175 μm .

One of ordinary skill in the art at the time of the invention would have found it obvious to use a membrane in the direct oxide fuel cell of Banerjee with a thickness as recited in claim 10 to better match the requirements of a particular electrochemical cell application, as taught by Banerjee.

As to methanol cross-over rate is reduced by 60% recited in claim 10, this limitation has been considered, and construed as the manner of operating an apparatus that adds no additional structure to the fuel cell system as claimed. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. However, because the solid electrolyte polymer membrane of the direct oxide fuel cell of Banerjee is structurally similar to that instantly disclosed, the fuel cell appears capable of being operated as claimed with similar if not identical claimed characteristics.

Regarding claim 11, Banerjee does not expressly teach the thickness of the membrane is 250 μm .

It has been held that obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties (e.g., *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ773 (Fed. Cir. 1985)). See MPEP 2144.05.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a membrane in the direct oxide fuel cell of Banerjee with a thickness as recited in claim 11 for the reasons discussed above with respect to claim 10.

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As to methanol cross-over rate is reduced by 75% recited in claim 11, this limitation has been considered, and construed as the manner of operating an apparatus that adds no additional structure to the fuel cell system as claimed. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. However, because the solid electrolyte polymer membrane of the direct oxide fuel cell of Banerjee is structurally similar to that instantly disclosed, the fuel cell appears capable of being operated as claimed with similar if not identical claimed characteristics.

Regarding claim 12, Banerjee teaches that the solid fluorinated polymer electrolyte membrane is a perfluorinated polymer (4:9-22).

Regarding claims 13 and 14, Banerjee teaches that the perfluorinated polymer comprises a carbon backbone and at least one side chain represented by the formula $--(OCF_2CFR_f)_a--OCF_2CFR'_fSO_3Y$, wherein R_f and R'_f are independently selected from F, Cl or a perfluorinated alkyl group having 1 to 10 carbon atoms, $a = 0, 1$ or 2 , and Y is H, an alkali metal, or NH_4 (4:34-41; claim 5).

Regarding claims 15-17, the limitation recited in this claim has been addressed above with respect to claims 2-4, respectively.

Correspondence / Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday-Thursday, 8 a.m. - 4 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E. Enin-Okut/
Examiner, Art Unit 1795

/Susy Tsang-Foster/
Supervisory Patent Examiner, Art Unit 1795